

WORK PLAN AND NOISE MODELING PROTOCOL FOR HIGH RISE BUILDINGS ALONG HONOLULU HI-CAP TRANSIT ELEVATED GUIDEWAY

Introduction

The purpose of this study is to estimate and assess transit noise operations to receivers in high rise buildings along the proposed Hi-Cap Transit line, in Honolulu, Hawaii. The Federal Transit Administration's (FTA) "Transit Noise and Vibration Impact Assessment" (FTA, May 2006), does not provide guidance in preparing a vertical propagation study of transit noise. This memo proposes a work plan and noise modeling protocol to be used in evaluating vertical noise propagation for review by FTA.

Measurement Procedure

A survey of high rise buildings along the proposed transit alignment will be conducted to identify noise sensitive receivers located above the proposed transit aerial structure. Representative buildings will be chosen for long-term (24-hour) noise measurements. For each representative building, at least two measurements will be taken at two different locations. One measurement will be taken on a floor above the proposed elevated structure, and one will be taken at ground level. Where outside areas are accessible, short-term measurements will be taken on other floors.

The noise measurements will be used to characterize the existing noise environment along the face of each building from street level to the top floor. This data will be use to identify noise impacts at each of these floors above the proposed transit aerial structure, in conjunction with the modeling protocol proposed below.

Modeling Protocol

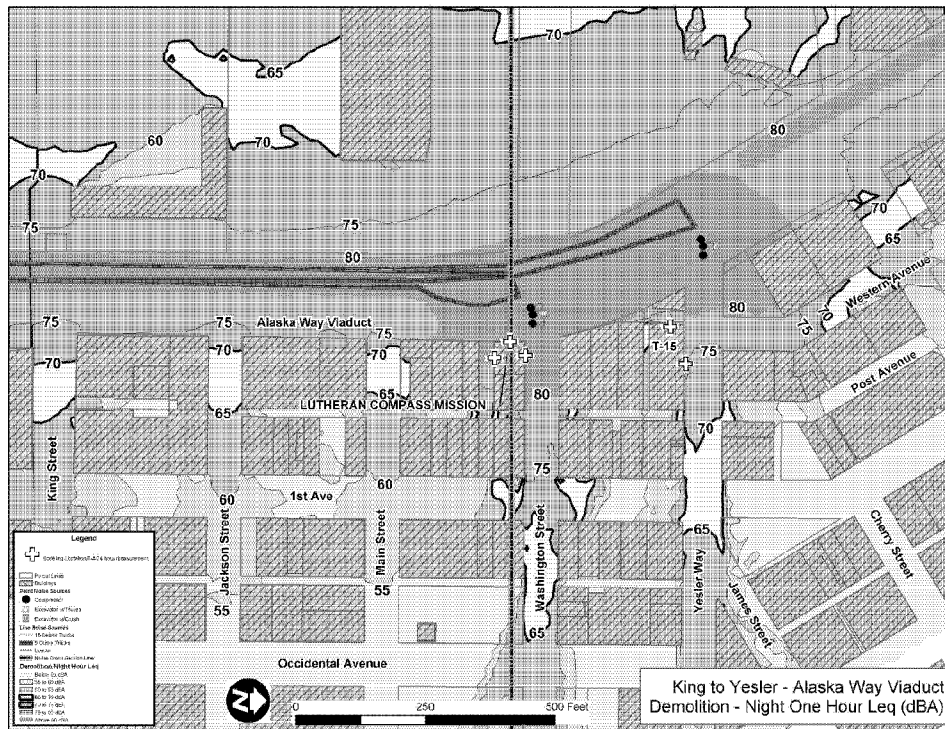
A base model will be constructed using the 3D noise modeling software *SoundPLAN* from Braunstein + Berhdt GmbH and Geographic Information System (GIS) data layers from the County of Honolulu for building footprints with height and elevation data. The proposed transit alignment and design elevations will be input into the model as a line source of data and the structure platform would be input as a floating screen. The structure's proposed noise barriers could also be input on top of the screen to simulate outside and inside barriers.

The *SoundPLAN* calculations will use FTA reference emission source levels for light rail transit vehicles as inputted into the ISO 9163 industrial noise model. Sound power levels for the three different operational speeds will be calculated by comparing the noise levels at 50 feet in the *SoundPLAN* model to the noise levels generated in the FTA *CREATE* model (FTA, 2006).

Using the GIS data layers, the *SoundPLAN* models will be built. The models will be run to determine the numerical noise levels and impacts at every floor of the representative buildings.

SoundPLAN can also generate a graphic representation of the noise data as contour lines. The contoured data can be represented at any elevation in either plan view or as cross sections. See figures below.

Plan View



Cross Section

